10 →

14 — CLIENT PROGRAM   o o o o

CLIENT PROGRAM

12 — COMMUNICATIONS TRANSPORT   o o o

COMMUNICATIONS TRANSPORT

16 — RESIDENT EXTERNAL CONTROLLING INTERFACE

N

1

o o o o

18 — DIGITAL COMMAND STATIONS

FIG. 1

FIG. 2

114

110

EXTERNAL
COMMAND
PROCESSOR
200

COMMAND
SENDER
202

FAIL

VALIDATION
FUNCTION
208

COMMAND
RESPONSE
PROCESSOR
206

PASS

RESULT
PROCESSOR
210

110/112

FIG. 3

MAIN LINE - PROFILE

0.8% 0.5% 0.6%
   0.6% 0.5% 0.6%

1.8%
1.5%   2.0%
              2.5%
      EW   SW & AA

0.4% 0.6%

WESTERN
DIVISION

ALLEGHENY
DIVISION

ATLANTIC
DIVISION

TO
T

S-T ABS

TO
U & V

Manual Block
Signals

D-T
ABS

D-T
ABS

YARD

ABS

ABS

ABS

TO
GG

TO
B

TO
W

CTC

D-T
ABS

TO
Q

D-T
ABS

E

G

SW & AA
RR

TO
K

SS

SS

SS

CTC

H YARD

TO
Q

TO
M

S-T
ABS

TO
J

TO
L

CTC

KEY:

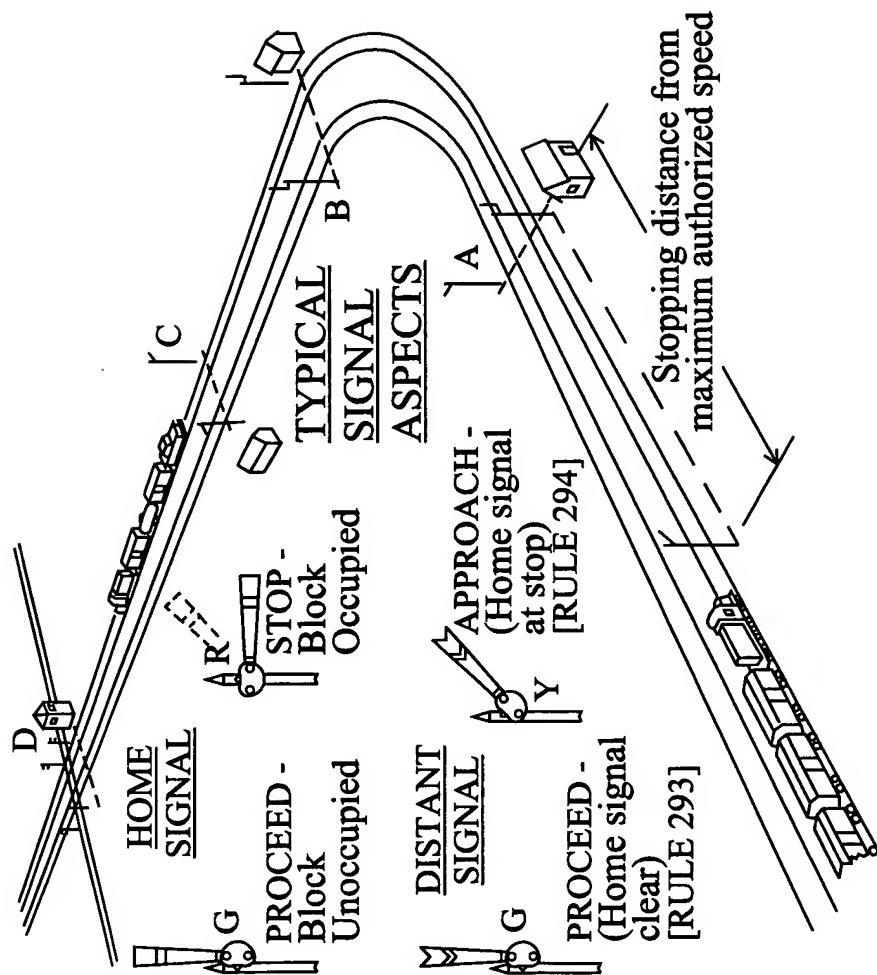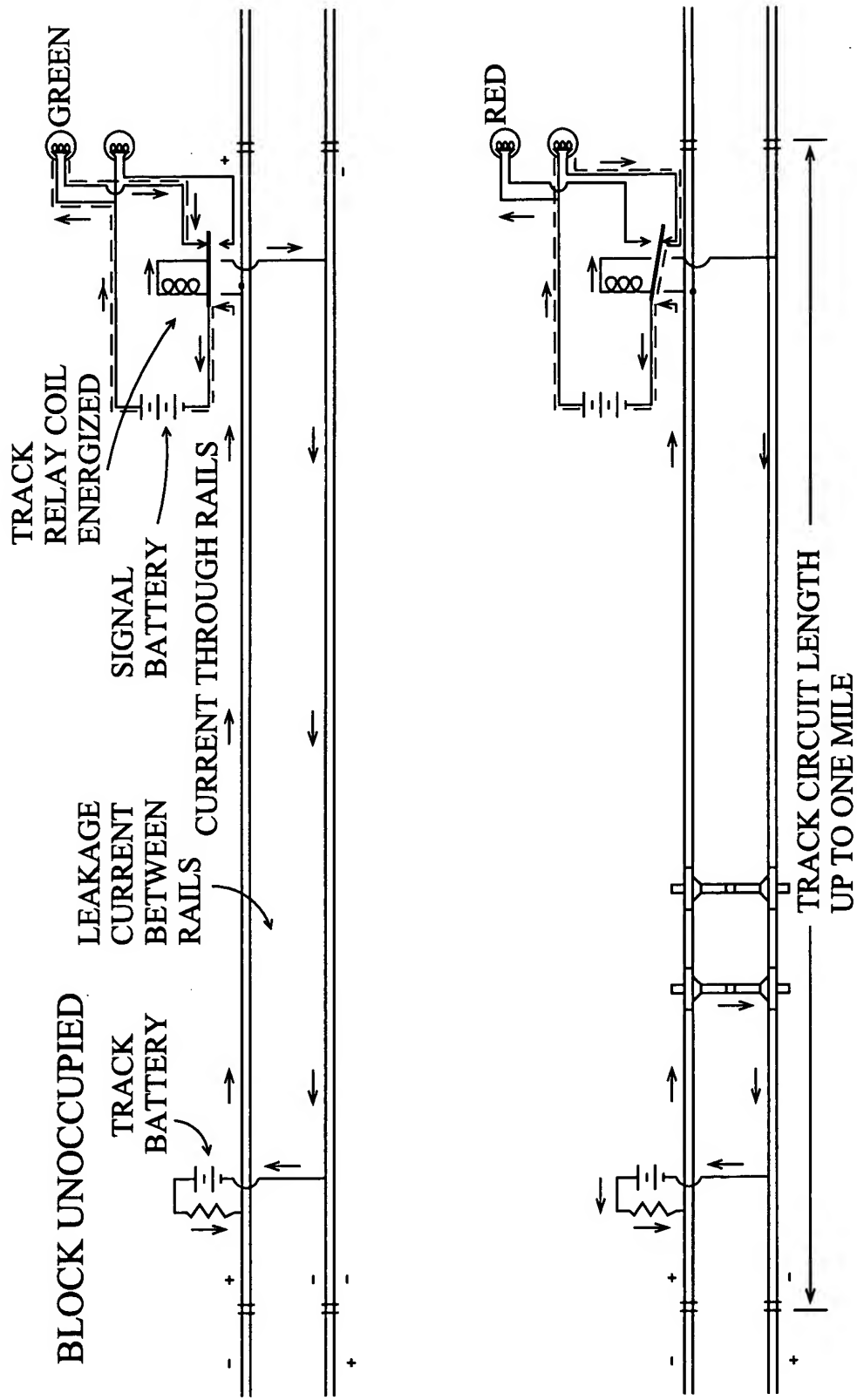|		
POWER-OPERATED SWITCHES	INTERLOCKING TOWER	CTC = CENTRALIZED TRAFFIC CONTROL
MANUALLY-OPERATED SWITCHES	RESTRICTED CLEARANCE TUNNEL	SS = SPRING SWITCH
DIRECTION OF SIGNAL-CONTROLLED TRAFFIC	ABS = AUTOMATIC BLOCK SIGNALS	D-T = DOUBLE-TRACK S-T = SINGLE-TRACK

FIG. 4

TYPICAL SIGNAL ASPECTS

HOME SIGNAL

G — PROCEED -
Block Unoccupied

R — STOP -
Block Occupied

DISTANT SIGNAL

G — PROCEED -
(Home signal clear)
[RULE 293]

Y — APPROACH -
(Home signal at stop)
[RULE 294]

Stopping distance from maximum authorized speed

FIG. 5

BLOCK UNOCCUPIED

GREEN

TRACK RELAY COIL ENERGIZED

SIGNAL BATTERY

CURRENT THROUGH RAILS

LEAKAGE CURRENT BETWEEN RAILS

TRACK BATTERY

RED

TRACK CIRCUIT LENGTH UP TO ONE MILE

FIG. 6

BLOCK SIGNAL PRACTICE - EXAMPLE

NAME	ASPECT	INDICATION
STOP	R ⊦ (MARKER PLATE)	STOP AND PROCEED
APPROACH	Y	PROCEED PREPARED TO STOP AT NEXT SIGNAL *
APPROACH MEDIUM	Y / Y	PROCEED PREPARED TO STOP AT SECOND SIGNAL *
ADVANCE APPROACH	Y / G	PROCEED PREPARED TO STOP AT THIRD SIGNAL †
CLEAR	G	PROCEED

R = RED   Y = YELLOW   G = GREEN

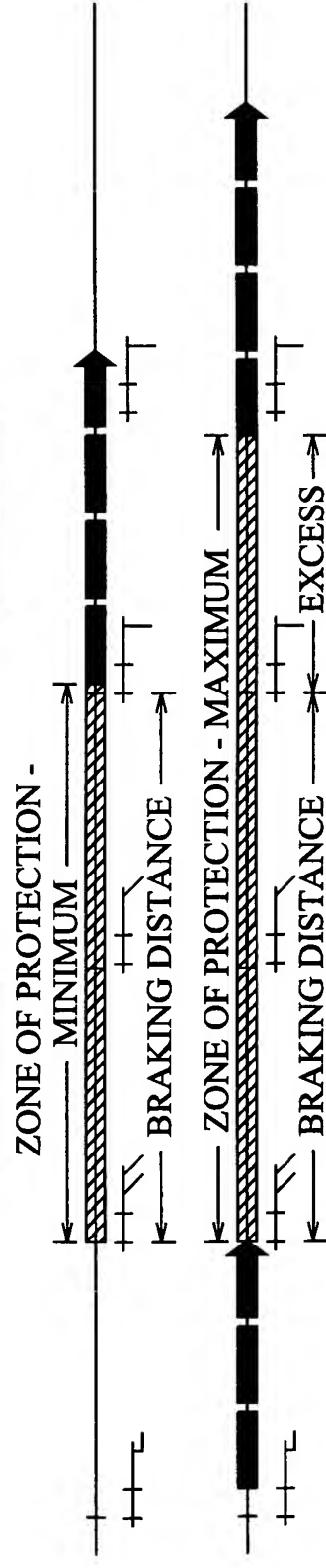* TRAIN EXCEEDING MEDIUM SPEED MUST IMMEDIATELY REDUCE TO THAT SPEED

† TRAIN EXCEEDING LIMITED SPEED MUST IMMEDIATELY REDUCE TO THAT SPEED

FIG. 7A

TWO - BLOCK, THREE - INDICATION

ZONE OF PROTECTION - MINIMUM

BRAKING DISTANCE

ZONE OF PROTECTION - MAXIMUM

BRAKING DISTANCE

EXCESS TRAIN SPACING
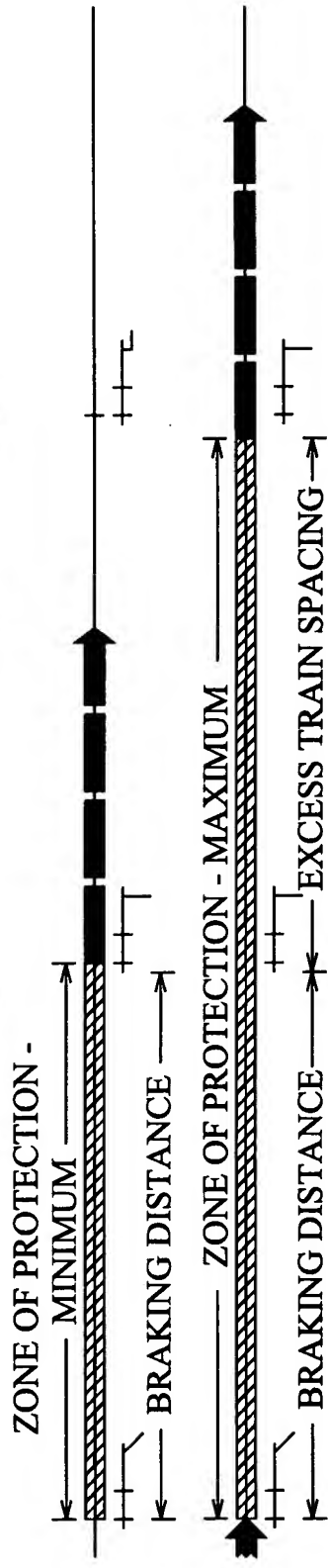
THREE - BLOCK, FOUR - INDICATION

ZONE OF PROTECTION - MINIMUM

BRAKING DISTANCE

ZONE OF PROTECTION - MAXIMUM

BRAKING DISTANCE

EXCESS

FOUR - BLOCK, FIVE - INDICATION

ZONE OF PROTECTION - MAXIMUM

BRAKING DISTANCE

EXCESS
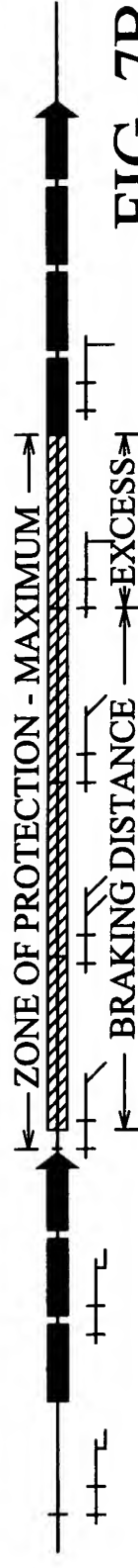
FIG. 7B
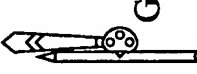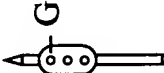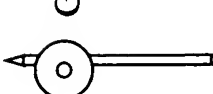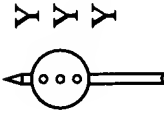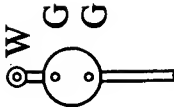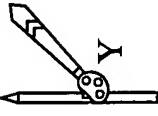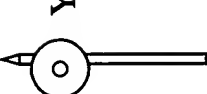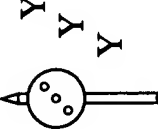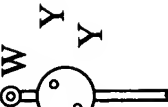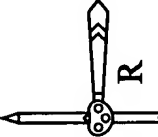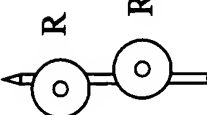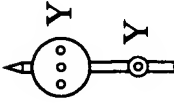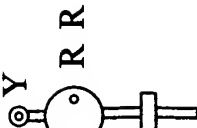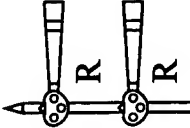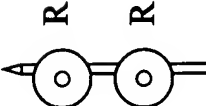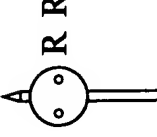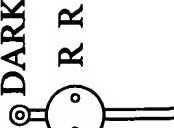
NAME	INDICATION	ASPECTS: SEMAPHORE (UPPER QUADRANT)	COLOR LIGHT	SEARCH-LIGHT	POSITION LIGHT (MODIFIED)	COLOR POSITION LIGHT
CLEAR	PROCEED AT NORMAL SPEED (RULE 281)	G	G	G	Y Y Y	W G G
APPROACH	APPROACH PREPARED TO STOP AT NEXT SIGNAL (RULE 285)	Y	Y	Y	Y Y Y	W Y Y
STOP AND PROCEED	STOP AND PROCEED AT RESTRICTED SPEED (RULE 509)	R	R	R R	Y Y	Y R R
ABSOLUTE STOP	STOP (RULE 292)	R R	R R	R R	R R	DARK R R

R = RED
Y = YELLOW
G = GREEN
W = LUNER WHITE

FIG. 8

ASPECTS OF SIGNALS AT: A   B   C

IF CLEARED FOR ROUTE
STRAIGHT THROUGH TO
TRACK ①   G   G   G
(NORMAL SPEED)   R   R   R
                R   R   R

IF CLEARED FOR DIVERGING
ROUTE THROUGH HIGH-SPEED
TURNOUT TO TRACK ②   G   Y   R
(LIMITED SPEED = 50 MPH)   R   G   G
                R   G   G

IF CLEARED FOR DIVERGING
ROUTE THROUGH NO. 16
CROSSOVER TO TRACK ③   G   Y   R
(MEDIUM SPEED = 30 MPH)   Y   G   G
                R   R   R

IF CLEARED FOR DIVERGING
ROUTE THROUGH NO. 12
CROSSOVER INTO TRACK ④   Y   Y   R
(SLOW SPEED = 15 MPH)   G   R   R
                R   G   G

DIRECTION OF APPROACH

FIG. 9A

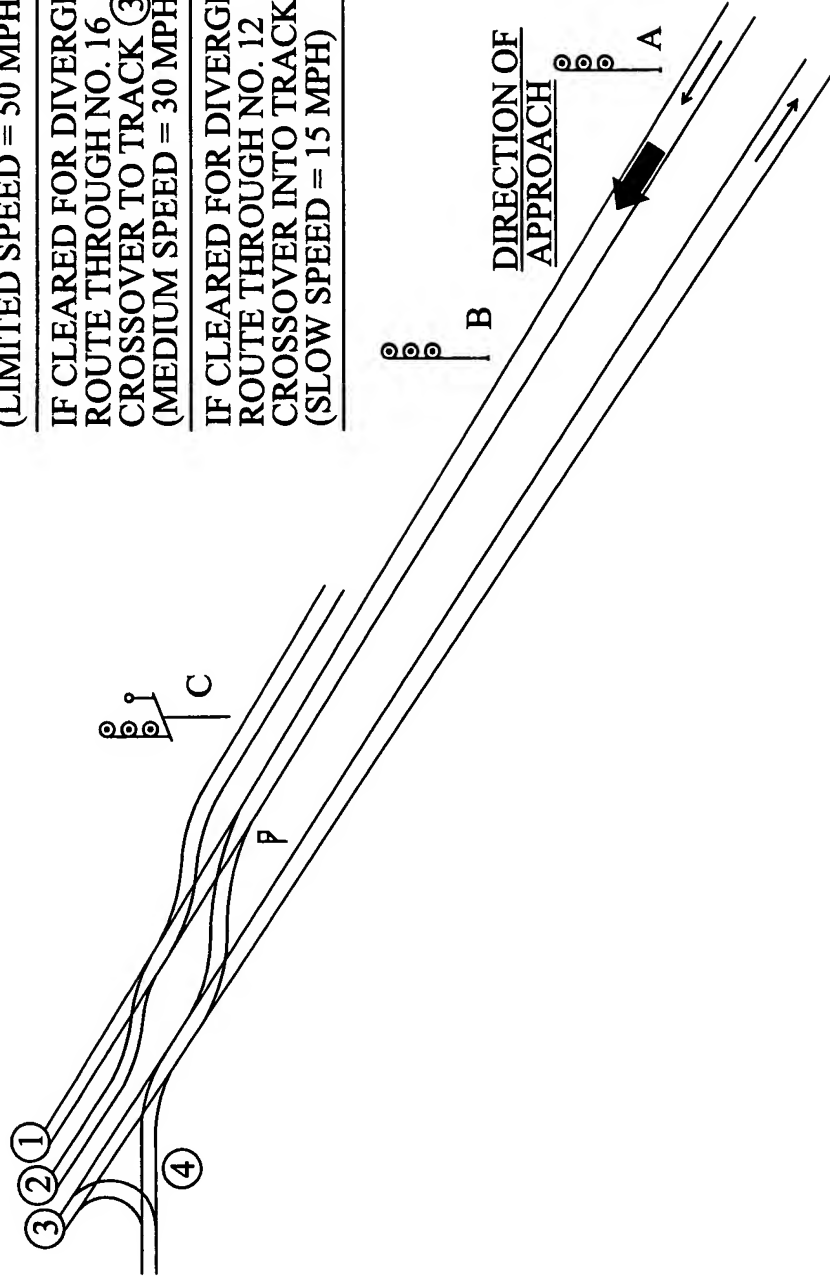| ASPECT	NAME	INDICATION
G R R	CLEAR	PROCEED AT NORMAL SPEED
Y R R	APPROACH	PROCEED APPROACHING NEXT SIGNAL PREPARED TO STOP; TRAIN EXCEEDING MEDIUM SPEED MUST IMMEDIATELY REDUCE TO THAT SPEED
Y R G	APPROACH SLOW	PROCEED APPROACHING NEXT SIGNAL AT SLOW SPEED; TRAIN EXCEEDING MEDIUM SPEED MUST IMMEDIATELY REDUCE TO THAT SPEED.
G Y R	ADVANCE APPROACH MEDIUM	PROCEED APPROACHING SECOND SIGNAL AT MEDIUM SPEED.
Y G R	APPROACH MEDIUM	PROCEED APPROACHING NEXT SIGNAL AT MEDIUM SPEED.
Y G G*	APPROACH LIMITED	PROCEED APPROACHING NEXT SIGNAL AT LIMITED SPEED
R G R	MEDIUM CLEAR	PROCEED; MEDIUM SPEED WITHIN INTERLOCKING LIMITS
R G G*	LIMITED CLEAR	PROCEED; LIMITED SPEED WITHIN INTERLOCKING LIMITS
R R G	SLOW CLEAR	PROCEED; SLOW SPEED WITHIN INTERLOCKING LIMITS

* May be replaced with triangular marker plate below second signal head (indicating "limited speed") if layout does not include medium speed routes
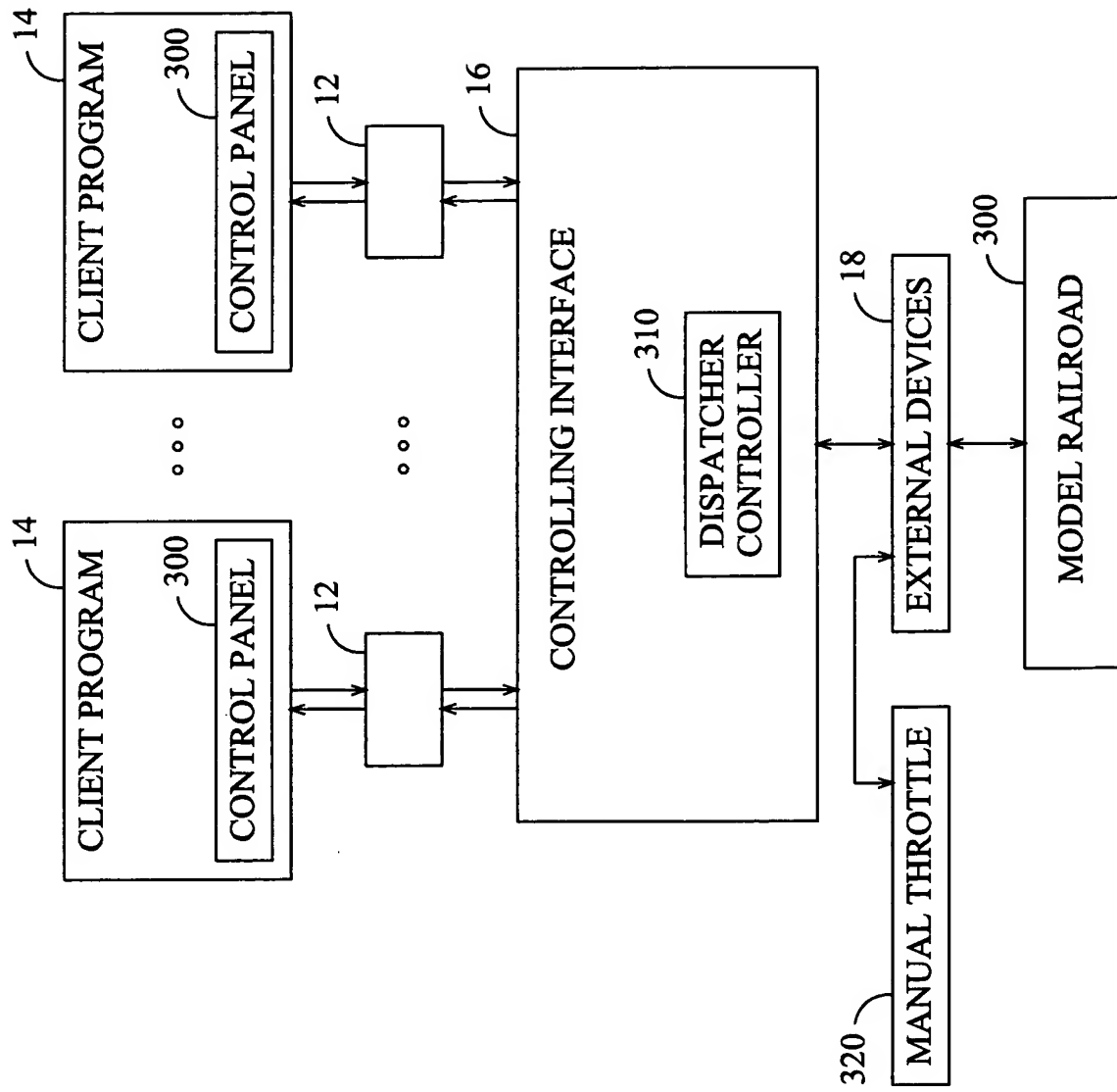
FIG. 9B

CLIENT PROGRAM 14

CONTROL PANEL 300

CLIENT PROGRAM 14

CONTROL PANEL 300

12

12

16

CONTROLLING INTERFACE

DISPATCHER CONTROLLER 310

18

MANUAL THROTTLE 320

EXTERNAL DEVICES

MODEL RAILROAD 300

FIG. 10

COMMAND QUEUE

PRIORITY	TYPE	COMMAND
5	A	INCREASE LOCO 1 BY 2
37	B	OPEN SWITCH 1
15	B	CLOSE SWITCH 1
26	B	OPEN SWITCH 1
6	A	DECREASE LOCO 2 BY 5
176	B	CLOSE SWITCH 6
123	C	TURN ON LIGHT 5
85	D	QUERY LOCO 3
5	A	INCREASE LOCO 2 BY 7
9	A	DECREASE LOCO 1 BY 2
0	E	MISC
37	D	QUERY LOCO 2
215	D	QUERY SWITCH 1
216	C	TURN ON LIGHT 3
227	D	QUERY SWITCH 5
225	C	TURN ON LOCO 1 LIGHT
0	D	QUERY ALL
255	A	STOP LOCO 1

FIG. 11